

Claims

- [c1] 1. An redundant array of independent disks (RAID) storage device, comprising L number of virtual disks having a plurality of stripes with each strip having a plurality of blocks, wherein a number of the blocks in each stripe is equal to a number of the virtual disks, and a block index, assigned to each block, the RAID storage device comprising:
- M number of storage devices comprising a plurality of blocks, wherein, M, L are positive integers, $M > L$, and M is not multiple of L, when the blocks of the virtual disks are distributed in the storage devices, a "position index" is assigned to the block in each storage device, and the position index is a mapping function of the block index.
- [c2] 2. The RAID storage device of claim 1, wherein the storage devices comprises a plurality of physical disks.
- [c3] 3. A redundant array of independent disks (RAID) storage device, comprising:
- M number of storage devices each comprising N number of storage blocks, and the storage blocks of the same J-column in the storage devices comprising:
- a plurality of complete stripe blocks, each comprising L

number of storage blocks, wherein, N , M , L are positive integers, $L < M$, and M is not multiple of L ; and at least a plurality partially complete stripe blocks.

- [c4] 4. The RAID storage device of claim 3, wherein each stripe block comprises at least a first physical data block and at least a first parity data block, and the first parity data block is obtained from the calculation based on the first physical data block.
- [c5] 5. The RAID storage device of claim 3, wherein the partially complete stripe blocks comprises at least a second physical data block.
- [c6] 6. The RAID storage device of claim 3, wherein the partially complete stripe blocks comprises at least a second parity data block.
- [c7] 7. The RAID storage device of claim 3, wherein the storage devices comprises a plurality of physical disks.
- [c8] 8. A redundant array of independent disks (RAID) storage device, comprising:
M number of storage devices, each comprising N number of storage blocks, and the storage blocks of the same J-column in the storage devices comprising:
a plurality of complete stripe blocks comprising L number of first physical data blocks, wherein, M , N , J are

positive integers, J is a positive integer of $1 \sim N$, $L < M$, and M is not multiple of L ; and at least a plurality partially complete stripe blocks.

[c9] 9. The RAID storage device of claim 8, wherein the partially complete stripe blocks comprises at least a second physical data block.

[c10] 10. The RAID storage device of claim 8, wherein the storage devices comprises a plurality of physical disks.